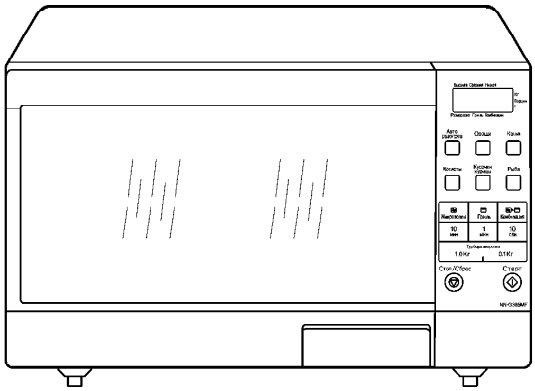
ORDER NO.PHAMOS0509034C3

Service Manual

Microwave Oven

NN-G385MF

ZPE(CIS Countries)



SPECIFICATIONS

Specification

Models		NN-G385MF
Power Source:		220V AC Single Phase, 50Hz
Power Requirement:	Microwave	1100W
	Heater	1100W
Output:	Microwave	800W
	Heater	1100W
Microwave Frequency:		2450MHz
Timer:		99 Min.90Sec
Outside Dimensions:		380mm(D) x 482mm(W) x 284mm(H)
Oven Cavity Dimensions:		330mm(D) x 325mm(W) x 191mm(H)
Weight:		9.0kg
PbF		This product with PbF
Specifications subject to change without notice.		

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

WARNING

1. This product should be serviced only by trained, qualified personnel.
2. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage."
3. If the unit cannot be repaired on site, advise the customer not to use until unit is repaired.
4. There are special components used in the microwave oven which are important for safety. These parts are marked with a ⚠ on the replacement parts list. It is essential that these critical parts be replaced only with the manufacture's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the orginal design.

This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country/area identifications shown below for your applicable product specification.

ZPE ..... For CIS Countries

CAUTION

About lead free solder (PbF)

Distinction of PbF PCB: PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

Caution:
- Pb free solder has a higher melting point than standard solder; Typically the melting point is 30 - 40˚C higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 370 ± 10˚C.
- Pb free solder will tend to splash when heated too high (about 600˚C).

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DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

INVERTER WARNING

This Inverter board looks like a regular PCB. However, this PCB drives the magnetron tube with extremely high voltage and high current. NEW H.V.

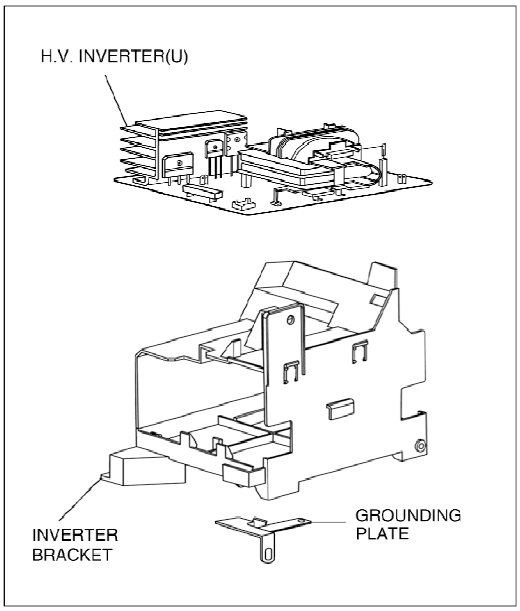
IT HAS:

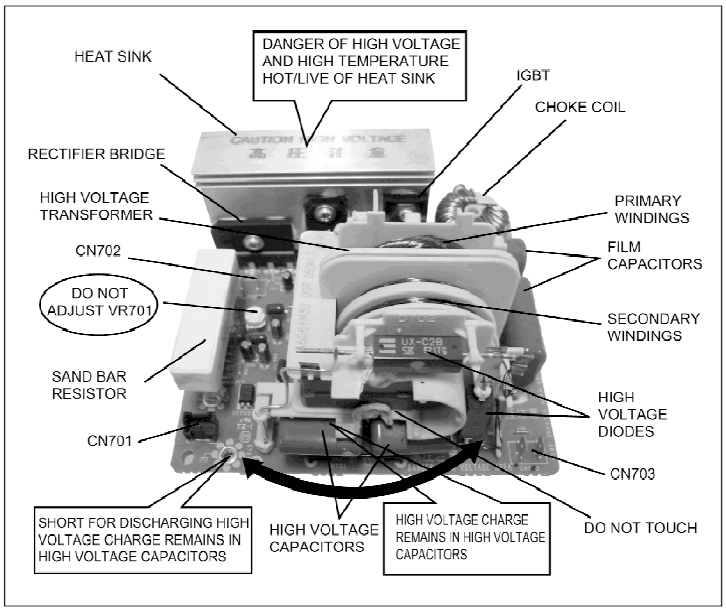
1. **Very high voltage and high current circuits.**
   It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.
2. **Aluminum heat sink that is energized with very high voltage and high heat energy.**
3. **Very high voltage which may remain in circuitry even when oven is off. High voltage charge may remain in the capacitors on the board.**

DO NOT:

* 1. **Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage charge may remain in circuits.**
* 2. **Do not touch aluminum heat sink because it is energized with very high voltage and is also very hot in high heat energy.**
* 3. **Do not try to adjust or tamper with preset control on the Inverter board because it is very dangerous to adjust without proper test equipment.**
* 4. **Do not test oven while Inverter grounding plate or screws are loose. It is very dangerous to operate H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.**

INVERTER POWER SUPPLY





1. SCHEMATIC DIAGRAM

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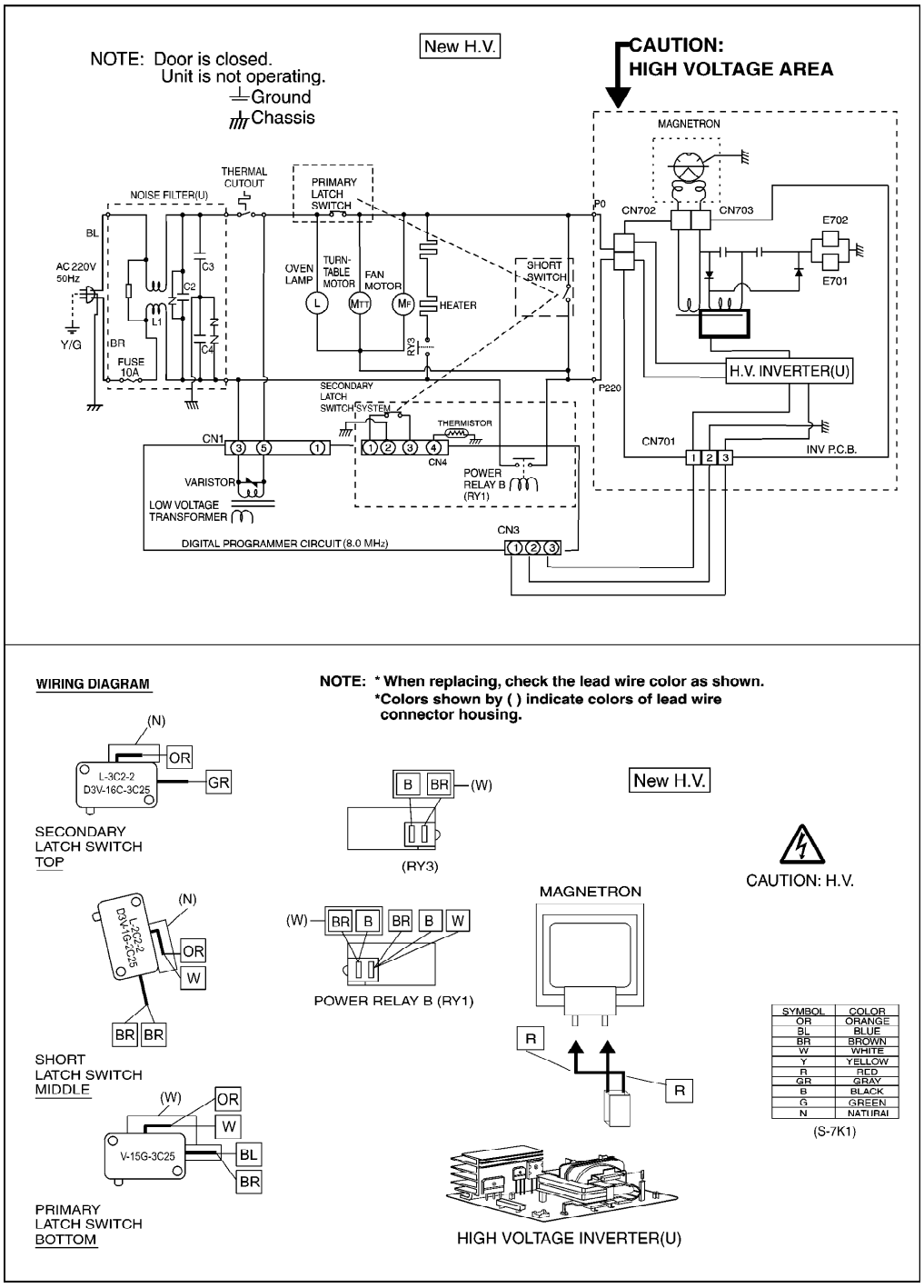

2. DESCRIPTION OF OPERATING SEQUENCE

2.1. Variable power cooking control

High Voltage Inverter Power Supply (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay always stays ON, but PWM (pulse width modulation) signal controls microwave output power.

NOTE:

The ON/OFF time ratio does not correspond with the percentage of

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microwave power since approximately 2 seconds are required for heating of magnetron filament.

Variable Power Cooking

POWER SETTING	OUTPUT POWER(%) APPROX.	MANUAL MICROWAVE DUTY	
		ON(SEC)	OFF(SEC)
HIGH	100%	22	0
MEDIUM-HIGH	70%	22	0
MEDIUM	55%	22	0
MEDIUM-LOW	30%	22	0
LOW	10%	15	7
DEFROST	30%	22	0

2.2. Inverter power supply circuit [NEW H.V.]

The Inverter Power Supply circuit powered from the line voltage, 220V 50Hz AC input supplies 4,000V DC to the magnetron tube, and functions in place of the H.V. transformer, the H.V. capacitor and H.V. diode.

1. **The AC input voltage 220V 50Hz is rectified to DC voltage immediately.**
2. **DC voltage will be supplied to the switching devices called IGBT. These devices are switched ON-OFF by the 20 to 40 kHz PWM (pulse width modulation) signal from the microcomputer in the DPC.**
3. **This drives the High voltage transformer to increase voltage up to 2,000V AC.**
4. **Then the half-wave doubler voltage rectifier circuit, consisting of the H.V. diodes and capacitors, generates the necessary 4,000V DC needed for the magnetron.**
5. **Output power of the magnetron tube is always monitored by the signal output from the current transformer built into the inverter circuit.**
6. **This signal is fed back to the microcomputer in the DPC to determine operating conditions and output necessary to control PWM signal to the Inverter Power Supply for control of the output power.**

2.3. Inverter defrost, Auto menu & Auto reheat

When the Auto Control feature is selected and the Start pad is tapped:

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1. **The digital programer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window. Table shows the corresponding cooking times for respective serving by categories.**

Inverter Turbo Defrost

SELECTED WEIGHT	COOKING TIME
1.0 Kg	15 min.40 sec.

Auto Menu (Froz. Foods)

SELECTED WEIGHT	COOKING TIME
200 g	13 min.00 sec.

Auto Reneat

SELECTED WEIGHT	COOKING TIME
200 g	1 min.30 sec.

2. **When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.**

3. CAUTIONS TO BE OBSERVED WHEN / TROUBLESHOOTING

Unlike many other appliances, the microwave oven is a high voltage, high current device. It is free from danger in ordinary use, though extreme care should be taken during repair.

Caution

Servicemen should remove their watches whenever working close to or replacing the magnetron.

3.1. Check the grounding

Do not operate on a two wire extension cord. The microwave oven is designed to be grounded when used. It is imperative, therefore, to ensure the appliance is properly grounded before beginning repair work.

3.2. Inverter warnings

DANGER, HIGH VOLTAGE AND HIGHTEMPERATURE (HOT/LIVE) OF THE INVERTERPOWER SUPPLY (U)

The High Voltage Inverter Power Supply handles very high voltage and current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair.

The aluminum heat sink is also energized with high voltage (HOT), do not touch when the AC input terminals are energized. The power device Collector is directly connected to the aluminum heat sink.

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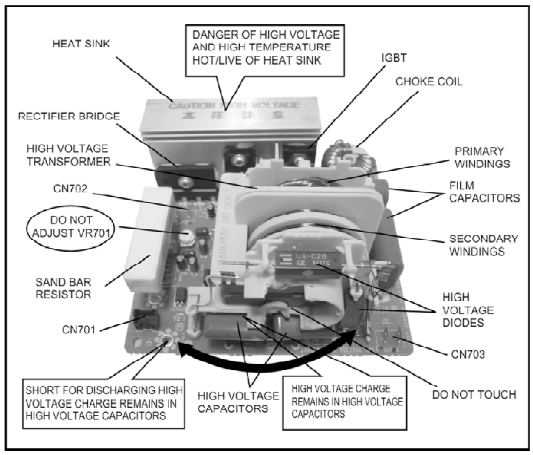
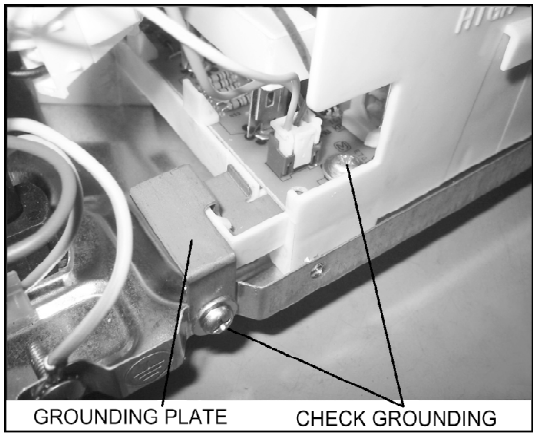
The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



H.V. Inverter warning

WARNING FOR INVERTER POWER SUPPLY (U) GROUNDING
Check the High Voltage Inverter Power Supply circuit grounding. The high voltage inverter power supply circuit board must have a proper chassis ground. The inverter grounding bracket must be connected to the chassis. If the inverter board is not grounded it will expose the user to very high voltages and cause extreme DANGER! Be sure that the inverter circuit is properly grounded via the inverter grounding bracket.



Grounding of the inverter circuit board

WARNING! DISCHARGE THE HIGH VOLATGE CAPACITORS
For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the Inverter Power Supply circuit board.
When replacing or checking parts, remove the power plug from the outlet and short the inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please be sure to touch the chassis ground side first and then short to the output terminals.

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Discharging the high voltage capacitors

WARNING

There is high voltage present with high current capabilities in the circuits of the primary and secondary windings, choke coil and heat sinkof the inverter. It is extremely dangerous to work on or near these circuits with the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

WARNING

Never touch any circuit wiring with your hand or with an insulated tool during operation.

3.3. Part replacement.

When any part or component is to be replaced, always ensure that the power cord is removed from the wall outlet.

3.4. When the 10A fuse is blown due to the operation of the short switch:

WARNING

When the 10A 220V fuse is blown due to the operation of the interlock monitor switch, replace all of the components (primary latch switch, short switch and power relay B (RY1)).

1. **This is mandatory. Refer to “adjustments and measurements” for the location of these switches.**
2. **When replacing the fuse, confirm that it has the appropriate rating for these models.**
3. **When replacing faulty switches, be sure the mounting tabs are not bent, broken or deficient in their ability to hold the switches.**

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3.5. Avoid inserting nails, wire etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any holes or gaps, because such objects may work as an antennaand cause microwave leakage.

3.6. Confirm after repair

1. **After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loosen or missing. Microwave might leak if screws are not properly tightened.**
2. **Make sure that all electrical connections are tight before inserting the plug into the wall outlet.**
3. **Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage).**

CAUTION MICROWAVE RADIATION
USE CAUTION NOT TO BECOME EXPOSED TO RADIATION FROM THE MICROWAVE MAGNETRON OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE
The following components have potentials above 2000V while the appliance is operated.

- **Magnetron**
- **High voltage transformer (Located on inverter (U))**
- **High voltage diodes (Located on inverter (U))**
- **High voltage capacitors (Located on inverter (U))**

Pay special attention to these areas.
When the appliance is operated with the door hinges or magnetron installed incorrectly, the microwave leakage can exceed more than 5mW/cm2. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

3.7. Sharp edges

Caution

Please use caution when unpacking, installing or moving the unit, as some exposed edges may be sharp to the touch and cause injury if not handled with care.

4. DISASSEMBLY AND PARTS REPLACEMENT / PROCEDURE

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4.1. Magnetron

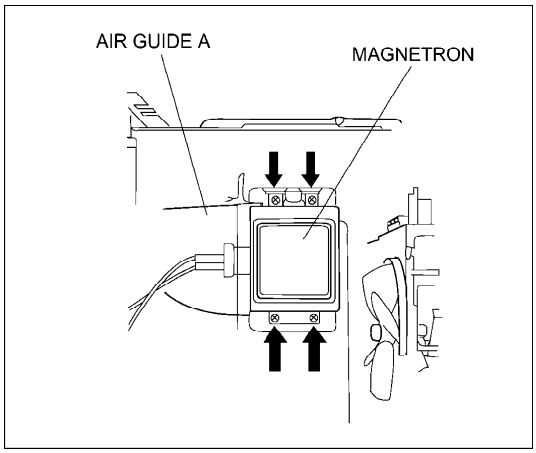
1. Discharge the high voltage capacitor.
2. Remove 1 screw holding air guide A on the magnetron.
3. Remove 1 screw holding reinforce bracket on the magnetron.
4. Remove 1 screw holding thermistor on the magnetron.
5. Disconnect 2 high voltage lead wires from magnetron filament terminals.
6. Remove 4 screws holding magnetron.

NOTE:

After replacement of the magnetron, tighten mounting screws properly in an x pattern, making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION
When replacing the magnetron, be sure the antenna gasket is in place.

CAUTION
When connecting 2 filament lead wires to the magnetron terminals, be sure to connect the lead wires in the correct position. The lead wire of high volatge transformer should be connected to “F terminal” and the lead wire from high voltage capacitor should be connected to “FA terminal”.



4.2. Digital programmer circuit (D.P.C) and membrane key board.

NOTE:

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Be sure to ground any static electric charge built up on your body before handling the DPC.

1. **Disconnect all connectors from D.P.C. board.**
2. **Disconnect 1 grounding terminal from the oven cavity.**
3. **Disconnect connector CN701 from H.V. inverter.**
4. **Remove 1 screw holding escutcheon base and slide the escutcheon base upward slightly.**
5. **Remove 1 screw holding D.P.C. board on the escutcheon base.**
6. **Separate D.P.C. board from tabs on the escutcheon base and remove D.P.C. board.**
7. **Remove rubber connector.**
8. **Separate display tube cover from tabs on the escutcheon base,then remove display and display tube cover.**

To replace membrane key board

Use such as knife etc. tools poke from the edge of escutcheon sheet and peel off escutcheon sheet and membrane key board completely from escutcheon base.

NOTE:

1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal. / 2. When installing new membrane key board, make sure that the surface of escutcheon base is cleaned sufficiently so that any problems (shorted contacts or uneven surface) can be avoided. / 3. Alignment position of membrane key board is as follows; / Membrane key board: Right and upper edges / Escutcheon sheet: Right and upper edges

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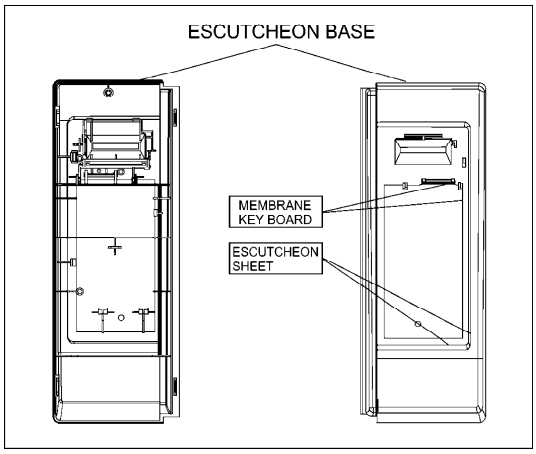

4.3. Low voltage transformer and/or power relays (RY1, RY2)

NOTE:

Be sure to ground any static electric charge built up on your body before handling the DPC.

1. **Using solder wick or a desoldering tool and 30W soldering iron carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.**
   NOTE:
   Do not use a soldering iron or desoldering tool of more than 30 watts on D.P.C. contacts.
2. **With all the terminal pins cleaned and separated from D.P.C. contacts, remove the defective transformer/power relays, Replace components making sure all terminal pins are inserted completely resolder all terminal contacts carefully.**

4.4. Fan motor

1. **Disconnect 2 lead wires from fan motor terminals.**
2. **Remove 3 screws holding orifice assy and detach the orifice assy from oven assy.**
3. **Remove fan blade from the motor shart by pulling it stralght out.**
4. **Remove 2 screws holding fan motor on orifice assy and detach the fan motor from orifice assy.**

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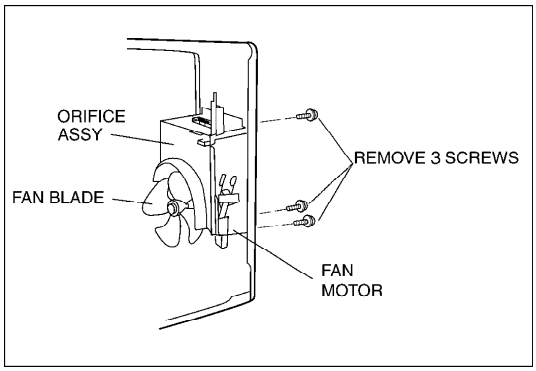

4.5. Door assembly

1. **Remove door C from door E by carefully pulling outward, starting from upper right hand corner using a flat blade screwdriver.**
2. **Separate door E from tabs on door A and remove door A.**
3. **Remove door screen B from door A.**
4. **Remove handle spring which hitching door handle,seperate door handle from door A by pulling outward door handle slightly, moving it towards the side of door A and out.**
5. **Open Door E at the opening angle of approximately 10~(Note: The door cannot be removed if the opening angle is greater than 10~).**
6. **Remove the door E from its hinges by pushing the door E's bottom upward and out.**
7. **Remove door key and door key spring from door E.**
8. **Replace other components.**

NOTE:

Door alignment is crucial. If door is misaligned, apply pressure until alignment is achieved.

NOTE:

After replacement of the defective component parts of the door, reassemble, and perform microwave leakage test.

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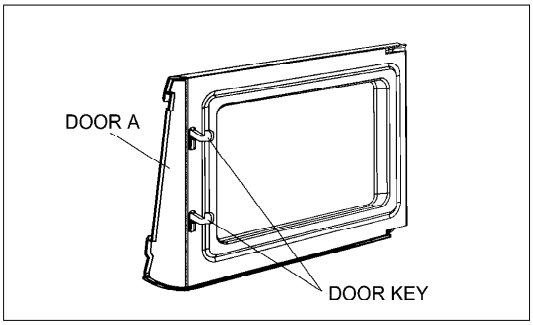

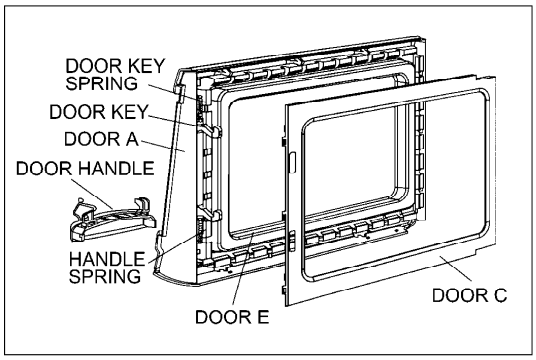

4.6. Turntable motor

1. **Remove the motor cover by breaking off at the 4 spots indicated by arrows with a cutter or the like.**
   NOTE:
   After removing the motor cover, be sure that cut portions are properly trimmed or bent to the inside so that no sharp edges will be exposed to outside.
2. **Disconnect 2 lead wires connected to the turntable motor.**
3. **Remove the turntable motor by removing 1 screw.**
   NOTE:
   After reInstalling the new turntable motor and reconnecting the 2 lead wires, reinstall the motor cover by rotating it around 180, tucking the 2 tabs under the base in the 2 provided slots, then screw the single tab to the base using a screw.

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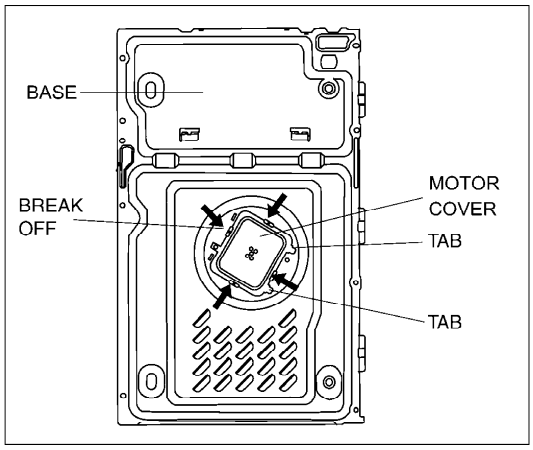
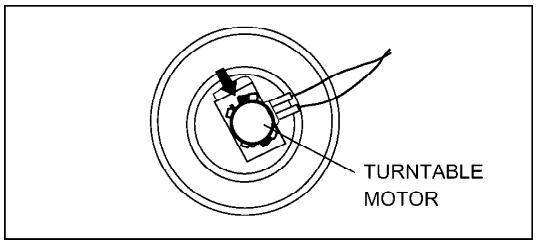


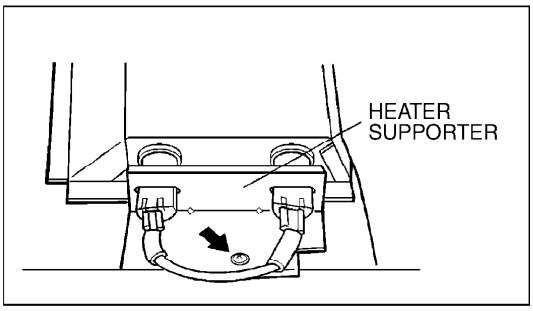


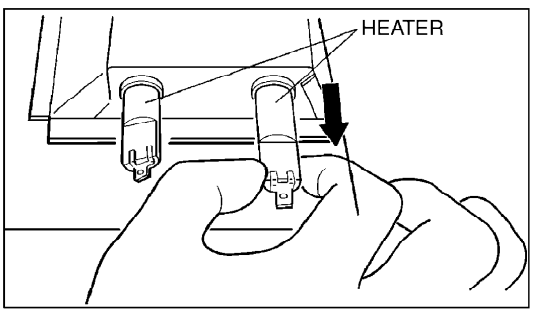
4.7. Quartz heater

1. Disconnect lead wires from heater terminals.

2. Remove 1 screw holding heater supports.

3. Remove the heater by pulling it out.





4.8. H.V. Inverter Power Supply

1. Remove the H.V. lead wire from magnetron terminals.

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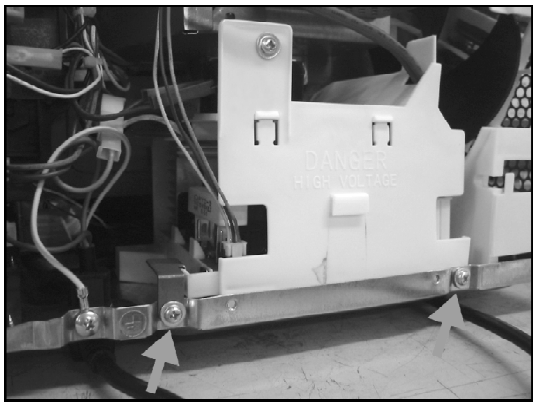
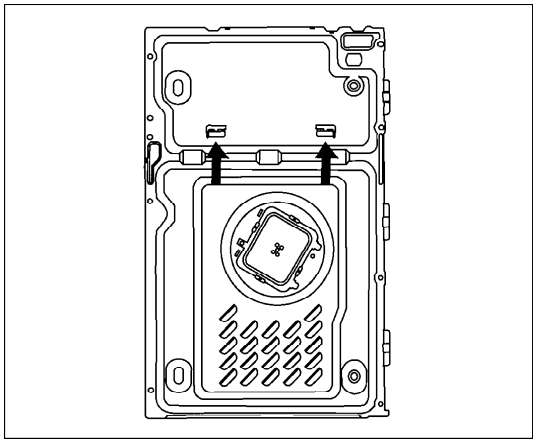
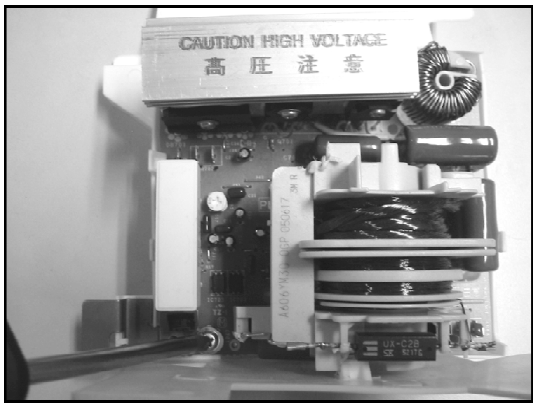
2. **Disconnect 2 connectors from CN701 & CN702 on H.V. inverter (U).**
3. **Remove 1 screw holding grounding plate on the base.**
4. **Remove 1 screw holding inverter bracket on the base.**



5. **Slide 2 locking tabs of inverter bracket at the bottom of the base in direction of arrows.**



6. **Remove 2 screws holding H.V. inverter to the inverter bracket.**



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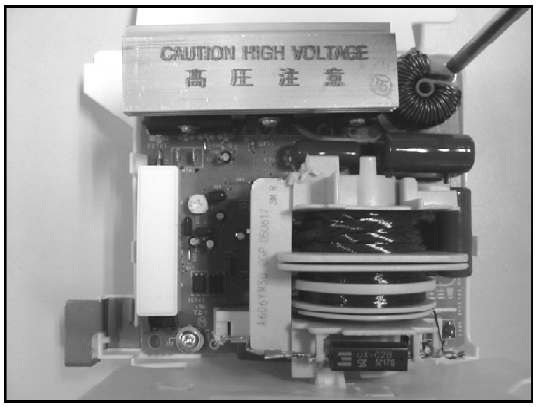

5. COMPONENT TEST PROCEDURE

CAUTION [NEW. H.V.]

1. High voltage is present at the high voltage terminal of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.

2. It is neither necessary nor advisable to attempt measurement of the high voltage.

3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitors.

5.1. Primary latch switch (door switch and power relay B) interlocks.

1. **Unplug lead connectors to Power Relay B and verify open circuit of the power relay B 1-2terminals.**
2. **Unplug lead connectors to Primary Latch Switch and Door Switch.**
3. **Test the continuity of switches at door opened and closed positions with ohm meter (low scale).**
   Normal continuity readings should be as follows.

	Door Closed	Door Opened
Primary Latch switch	0 Ω (Close)	∞ Ω (Open)
Door Switch	0 Ω (Close)	∞ Ω (Open)
Power Relay B	∞ Ω (Close)	∞ Ω (Open)

5.2. Short switch & monitor

1. **Unplug lead wires from Inverter Power Supply (U) primary terminals.**
2. **Connect test probes of ohm meter to the disconnected leads**

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which were connected to Inverter Power Supply (U).

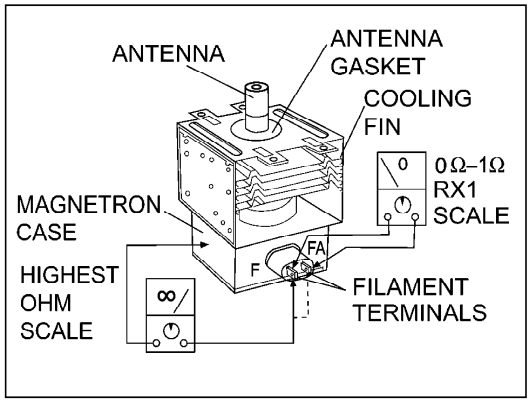
3. **Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.**
   Normal continuity readings should be as follows.

Door Opened	Door Closed
0 Ω	∞ Ω

5.3. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

1. **Isolate magnetron from the circuit by disconnecting the leads.**
2. **A continuity check across magnetron filament terminals should indicate one ohm or less.**
3. **A continuity check between each filament terminal and magnetron case should read open.**



5.4. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit. (Refer to Mini Manual)

5.5. Inverter power supply (U)

DO NOT try to REPAIR H.V. Inverter power supply (U).Replace complete H.V. Inverter(U) Unit.

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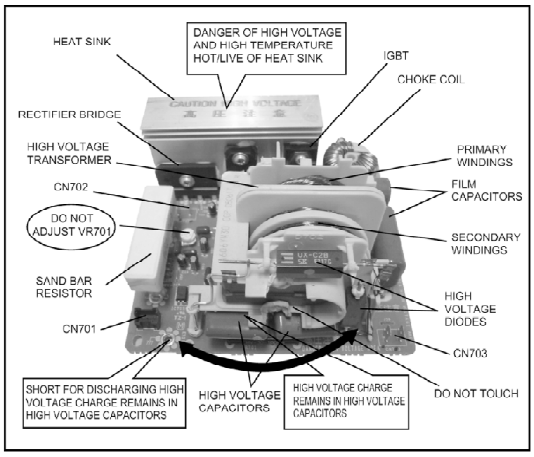

DANGER HIGH VOLTAGE

Test if failure codes of H95, H97 or H98 appear by doing the following procedure. It is recommended to use an AC line input current Ampere meter for testing.

Test1

1. Program DPC.
   A. Tap [Reheat] pad once.
   B. Tap [10 min.] pad thrice.

2. Place 1 liter of water load into oven cavity.

3. Unplug 2 pin H.V. lead wire connector CN703 from magnetron tube.

4. Program oven at High power for 1 minute and press start.
   A. After approximately 23 seconds, oven stops.
   B. During oven operation, input current is approximately 0.5 to 1A.
   If both a and b are OK, proceed to test 2.

	INPUT AMPERE	FAILURE CODE
Unplug CN703	0.5 to 1A	Oven stops in 23 seconds after started.

Test2

Continued from Test 1

1. Unplug 3 pin connector CN701. CN703 remains unplugged.

2. Program oven at High power for 1 minute and press start.

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A. After approximately 3 seconds, oven stops.
B. During oven operation, input current is approximately 0.4A.

	INPUT AMPERE	FAILURE CODE
Unplug CN701	<0.4A	Oven stops in 3 seconds after started.

If both a and b check OK, the Inverter Power Supply (U) can be determined to be OK.

5.6. Temperature thermistor

Those sensor monitors the heat produced by the heater circuit and maintains the magnetron temperature which user had selected. The reading across the temperature thermistor should be 7.2 K Ω ± 7% in an area with the 75°C temperature.
If the resistance reading is out of the range stated here, the thermistor is detective and must be replaced.

6. MEASUREMENTS AND ADJUSTMENTS

6.1. Adjustment of Primary latch switch, Secondary latch switch and Short switch.

1. **Mount the Primary latch swith, the Secondary latch switch and the Short switch to the door hook assembly as shown in ILL.**
   NOTE:
   No specific individual adjustments during installation of the Primary latch switch, Secondary latch switch or Short switch to the door hook are required.
2. **When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrows in the illustration so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.**
3. **Reconnect the short switch and check the coninuity of the monitor circuit and all latch switches again by following the component test procedures.**

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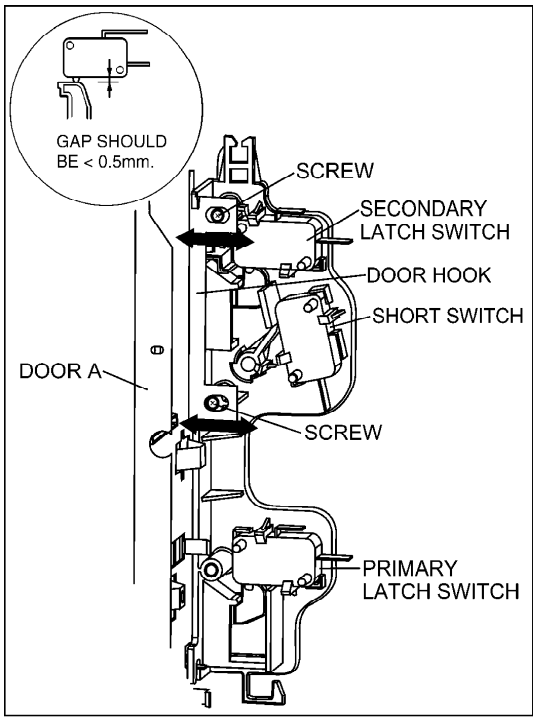

6.2. Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

- **1 liter beaker**
- **Glass thermometer**
- **Wrist watch or stopwatch**

NOTE:

Check the line voltage under load.Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurately as possible.

1. **Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the water's temperature. (recorded as T1).**
2. **Place the beaker on the center of glass tray. / Set the oven for High power and heat it for exactly one minute.**
3. **Stir the water again and read the temperature of the water. (recorded as T2).**
4. **The normal temperature rise at High power level for each model is as shown in table.**

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TABLE (1L-1min.test)

RATED OUTPUT	TEMPERATURE RISE
800W	Min.12.6°F(7.0°C)

7. TROUBLESHOOTING GUIDE

DANGER HIGH VOLTAGES

1. **DO NOT RE-ADJUST PRESET CONTROL on the H.V.Inverter (U). It is very dangerous to repair o without proper test equipment because this circuit handles very large current and high voltage. a misaligned inverter circuit is dangerous.**
2. **Ensure proper grounding before checking for trouble.**
3. **Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.**
4. **Discharge high voltage remaining in the H.V.Inverter (U).**
5. **When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from parts and then check continuity with the AC plug removed. To do otherwise may result in a false or damage to your meter. When disconnecting a plastic connector from a terminal, you must ho plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be da the connector cannot be removed.**
6. **Do not touch any parts of the circuitry on the digital programmer circuit, since static electric dis may damage this control panel. Always touch yourself to ground while working on this panel to any static charge in your body.**
7. **220V AC is present on the digital programmer circuit (Terminals of power relay's and primary ci Digital Programmer Circuit). When troubleshooting, be cautious of possible electrical shock haz**

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

7.1. (Trouble) Oven stops operation during cooking

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven stops in 3 seconds after pressing start pad	No 220V AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY-1 3. Loose lead wire conne CN701, CN702
	Oven stops in 23 seconds after pressing start pad	H.V.Inverter (U) operates by the control signals from DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire conne CN703
2.	No display and no operation at all. Fuse is blown.	Most probably loose connection of connectors, or door latch mechanism is not adjusted properly	1. Align door, Door Latch 2. Loose wiring connecto

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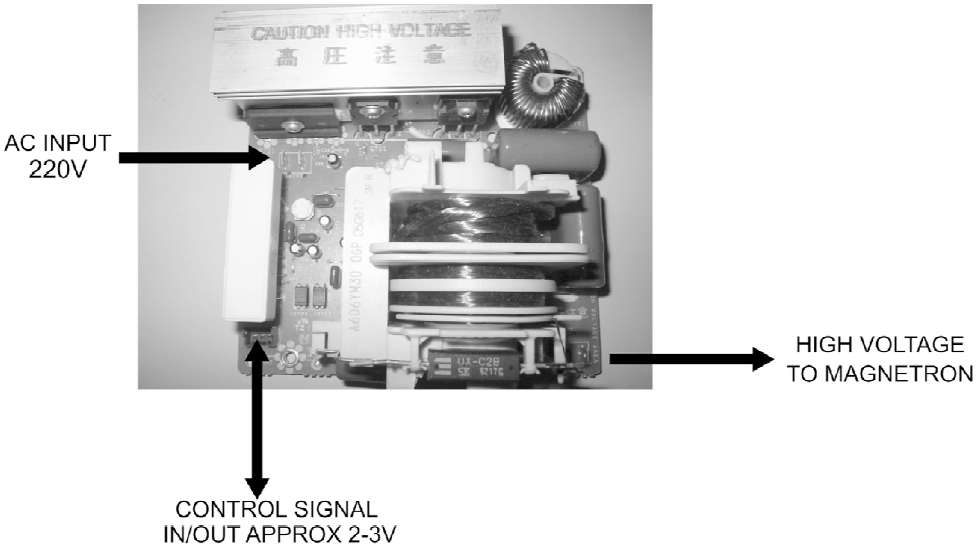

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness Open thermal cutout 2. Open low voltage transformer Defective DPC 3. 4.	Check fan motor if therm is defective.
2.	No display and no operation at all. / Fuse is blown.	1. Shorted lead wire harness Defective primary latch switch 2. (NOTE 1) 3. Defective short switch (NOTE 1) 4. Defective Inverter Power Supply (U)	Check adjustment of pri secondary latch switch a switch including door.
		NOTE 1: All of these switches must be replaced at the same time. Check continuity of power relay B (RY-1)'s contacts (between and if it has continuity, replace power relay B (RY-1) also.	
3.	Oven does not accept key input(Program)	1. Key input is not in proper sequence Open or loose connection of 2. membrane key pad to rubber connector (Flat cable) 3. Shorted or open membrane key board 4. Defective DPC	Refer to operation proce Refer to DPC troublesho
4.	Fan motor turns on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch	Adjust door and latch sv

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	SYMPTOM	CAUSE	CORRECTIONS
5.	Timer starts count down but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will cause lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component H.V. Inverter Power Supply (u) Magnetron 4. Open or loose wiring of power relay B (RY-1) 5. Defective primary latch switch 6. Defective DPC or power relay B (RY-1)	Adjust door and latch sv Check high voltage com according to component procedure and replace if defective. Refer to DPC troublesho
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit.(Intermittent oscillation) 3. Aging change of magnetron	Consult electrician
8.	Fan motor turns on and turntable rotates when door is opened.	1. Shorted primary latch switch	
9.	Oven does not operate and return to plugged in mode as soon as start pad is pressed.	1. Defective DPC	Check grounding conne escutcheon base.
10.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
11.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
12.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout	Adjust door and latch sv

7.2. Trouble related to Digital Programmer Circuit

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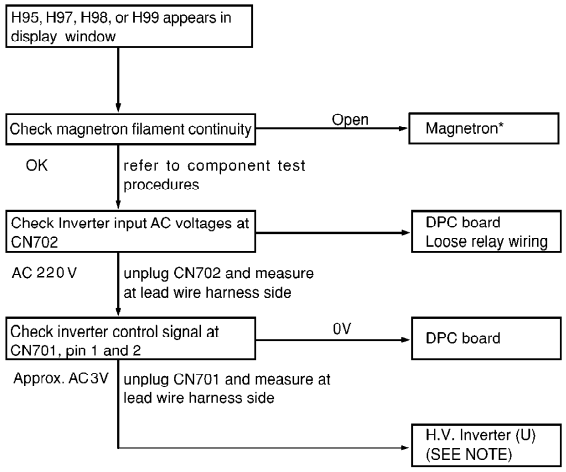
SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse pattern of DPC	Normal	→ Step2
			Open(NOTE)	Shorted circuit of ZNR, L.V.T,Oven Lamp etc. Replace DPC or Fuse Pattern
	2	Low voltage transformer (L.V.T.) secondary voltage	Abnormal 0V	L.V.T.
			Normal	→ Step3
	3	IC-1 pin 23 voltage (Emitter of Q11)	Abnormal	ZD11, Q11
			Normal=3.3V	IC1,CX320,Display
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 29 voltage	Abnormal	IC-1
			Normal	BZ210, Q210
Power relay A(RY-2) does not turn on even though the program had been set and the start pad is tapped	1	IC-1 pin 2 voltage while operation	Abnormal	IC-1
			Normal=5V	→ Step 2
	2	Short circuit between collector and Emitter of Q225	Still not turn on	RY-2
			RY-2 turns on	Q225
No microwave oscillation at any power	1	IC-1 pin 1 voltages while operation at high power	Abnormal	IC-1
			Normal=3.3V	→ Step 2
	2	Transistor Q224 & Q231	Abnormal	Q224 and (or) Q231
			Normal	RY-1
Dark or unclear display	1	Replace display and check operation	Normal	Display
			Abnormal	IC-1
Missing or lighting of unnecessary segment	1	Re-adjust rubber connector, check operation and replace IC1	Normal	IC-1
			Abnormal	Display
H95/H97/H98 appears in window and oven stops operation. Program High power for 1 minute and conduct following test quickly, unless H95/H97/H98 appears and oven stops	1	Unplug CN702 (2 pin) connector and measure voltage between terminals	Abnormal= 0V	1. Latch Switch 2. D.P.C. /Power Relay
			Normal= 220V	→ Step 2
	2	Unplug CN701 (3 pin) connector and measure pin 3 voltage	Abnormal= 0V	D.P.C.
			Approx. AC 3V	Magnetron

7.3. Troubleshooting of inverter circuit (U) and magnetron [NEW H.V.]

This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H95, H97, H98, and H99 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H95, H97, H98, and H99. First, you must program the DPC by pressing [Reheat] pad once, and then pressing [10 min.] pad thrice. Program unit for operation. H95, H97, H98, H99 appears in display window a short time after start key is pressed and there is no microwave oscillation.


H95, H97, H98, or H99 appears in display window
Check magnetron filament continuity
Open
Magnetron*
OK
refer to component test procedures
Check Inverter input AC voltages at CN702
DPC board
Loose relay wiring
AC 220 V
unplug CN702 and measure at lead wire harness side
Check inverter control signal at CN701, pin 1 and 2
0V
DPC board
Approx. AC3V
unplug CN701 and measure at lead wire harness side
H.V. Inverter (U) (SEE NOTE)

NOTE: After check, unplug unit to reset to normal operation mode.

NOTE: DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET CONTROL on the board. It is very dangerous to repair or adjust without proper test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

* Check magnetron filament for open or short to case before proceeding to determine a good magnetron.

Alternate way to troubleshoot oven with AC Ampere meter used
H95, H97, H98, H99 appears in display window a short time after start key is pressed and no microwave oscillation with AC Ampere meter used for troubleshooting

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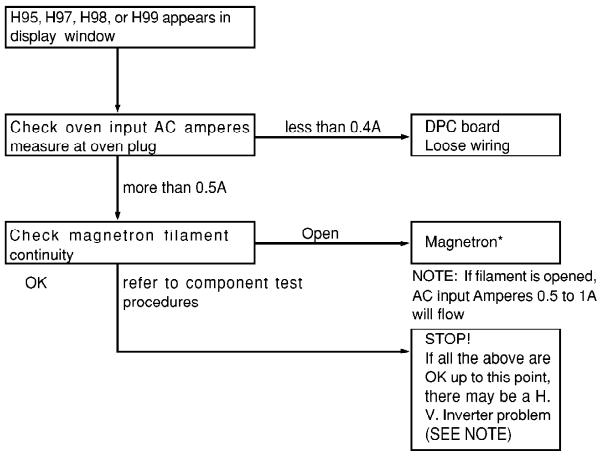

H95, H97, H98, or H99 appears in display window
Check oven input AC amperes measure at oven plug
less than 0.4A
DPC board Loose wiring
more than 0.5A
Check magnetron filament continuity
Open
Magnetron*
OK
refer to component test procedures
NOTE: If filament is opened, AC input Amperes 0.5 to 1A will flow
STOP! If all the above are OK up to this point, there may be a H. V. Inverter problem (SEE NOTE)

NOTE: DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET CONTROL on the board. It is very dangerous to repair or adjust without proper test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

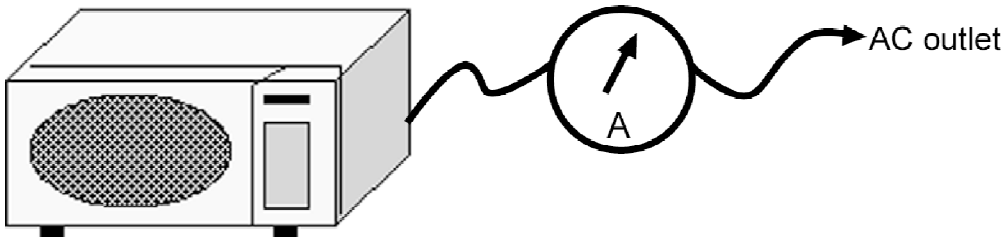
* Check magnetron filament for open or short to case before proceeding to determine a good magnetron.

NOTE: After check, unplug unit to reset to normal operation mode.

7.4. Simple way of H.V. Inverter/magnetron troubleshooting

Purpose:
Simple way (3/23 seconds rule) of identifying whether it's Magnetron, Inverter, or others.

Set-up:
The unit under question is connected through the Ammeter as shown below.



Procedure:
Follow the matrix table below to identify the problem source.

Note:

Do not replace both Inverter board and Magnetron simultaneously and automatically without going through this procedure.

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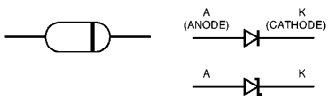
Power will:	Ammeter reading is:	To do:	Remedy:
Shut off in 23 seconds after "Start".	1. Between 0.5A and 1.0A.	Check and repair open magnetron circuit	Open magnetron wi between Inverter an magnetron terminal.
	2. Between 1.0A and 2.0A.	Check continuity of D702 in Inverter PCB.	
		1. D702 shorted	Replace H.V.Inverte (F606YM300GP)
		2. D702 is OK	Replace magnetron
Shut off in 3 seconds after "Start"	1. Less than 0.5A	Check open circuit: Latch Switch, DPC, Power Relay and CN701	Replace defective component(s), or co switch, cables and connectors.

7.5. How to check the semiconductors using an OHM meter

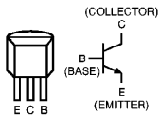
Diode



	FORWARD	REVERSE
A-K	SMALL	∞

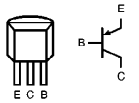
Transistor

NPN Transistor
2SC·····
2SD·····



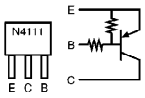
	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor
2SA·····
2SB·····



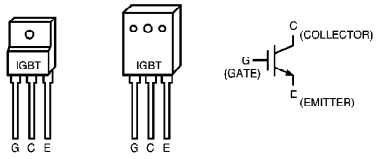
	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

Digital Transistor
PNP Transistor



	FORWARD	REVERSE
E-B	10kΩ ~ 30kΩ	10kΩ ~ 30kΩ
C-B	50kΩ ~ 90kΩ	∞
C-E	40kΩ ~ 80kΩ	∞

IGBT
(INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

8. EXPLODED VIEW AND PARTS LIST

8.1. EXPLODED VIEW

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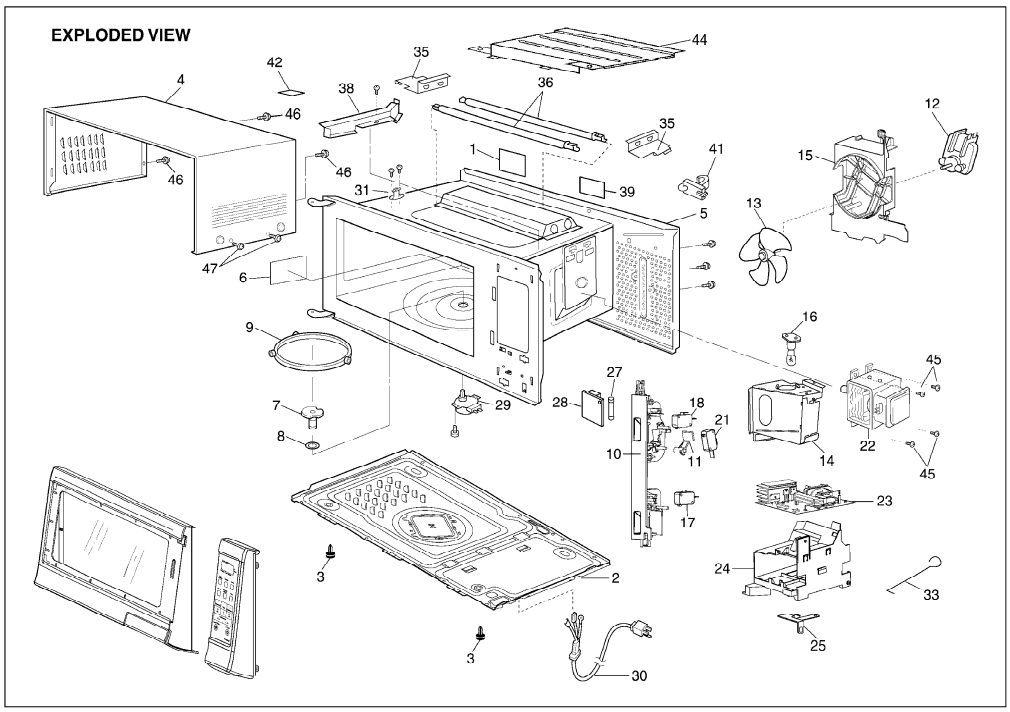

8.2. PARTS LIST

NOTE:

1. **When ordering replacement part(s), please use part number(s) shown in this part list.**
   Do not use description of the part.
2. **Important safety notice:**
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacture's specified parts.

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Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		F01577K10SZP	NAME PLATE	1	
2		F10017K10XP	BASE	1	
3		F10084T00AP	RUBBER FOOT	2	
4		F110D6N60SXP	CABINET BODY (U)	1	
5	⚠	F200A7K10XP	OVEN (U)	1	
6		F20556S10XP	COVER	1	
7		F21316E70XP	PULLY SHAFT	1	
8		F2177-F80	WASHER		
9		F290D6S10XP	ROLLER RING (U)	1	
10	⚠	F30206S10XP	DOOR HOOK	1	
11		F31365Q00AP	HOOK LEVER A	1	
12		F400A6S10XP	FAN MOTOR	1	
13		F4008-1E60	FAN BLADE	1	
14		F40256S10XP	AIR GUIDE A	1	
15		F41446S10XP	ORIFICE	1	
16		F612E5G50XN	INCANDESCENT LAMP (U)	1	
17	⚠	J61424T00AP	MICRO SWITCH	1	
18	⚠	J61414T00AP	MICRO SWITCH	1	
21	⚠	J61784T00AP	SHORT SWITCH	1	
22	⚠	2M261-M22J3Y	MAGNETRON	1	
23	⚠	F606YM300GP	H.V.INVERTER (U)	1	
24		F65857K10XP	INVERTER BRACKET	1	
25		F66627K10XP	GROUNDING PLATE	1	
27	⚠	A62304210BP	FUSE	1	10A, 250V
28		F692Y7K10ZP	NOISE FILTER (U)	1	
29		F63266S10XP	TURNTABLE MOTOR	1	
30	⚠	F900C7K10ZP	AC CORD W/PLUG	1	
31	⚠	F61456N60AP	THERMAL CUTOUT	1	-20°C ON, 150°C OFF
33		F11656S10XP	REINFORCE BRACKET	1	
35		F64605G50XN	HEATER MOUNTING PLATE	2	
36		F630G6B90XN	HEATER (AU)	2	
38		F40268920XN	AIR GUIDE B	1	
39		F00066W10ZP	CAUTION LABEL	1	
41		F11407000AP	STOPPER	1	
42		F01506W50XP	NO TOUCHING LABEL	1	
44		F22175G60AP	INSULATE BRACKET	1	
45		XTWFA4+12T	SCREW	4	MAGNETRON
46		XTWFA4+12D	SCREW	3	CABINET BODY
47		XTTFA4+6BN	SCREW	2	CABINET BODY SIDE

8.3. DOOR ASSEMBLY

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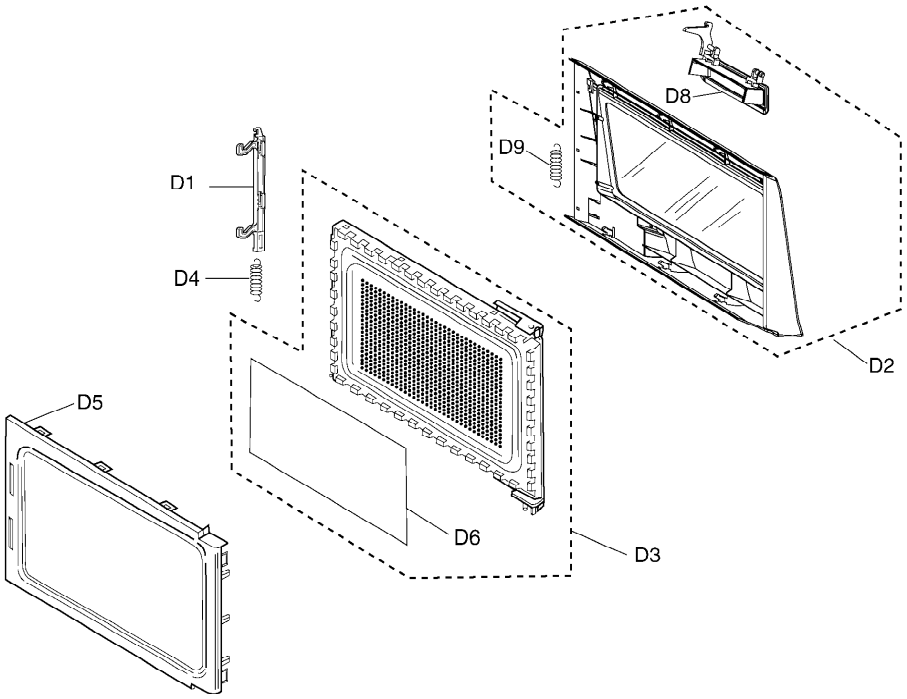

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1		F30186S10XP	DOOR KEY A	1	
D2	⚠	F301A7K10SXP	DOOR A	1	
D3	⚠	F302K6S10XP	DOOR E(U)	1	
D4		F30216S10XP	DOOR KEY SPRING	1	
D5	⚠	F30856S10XP	DOOR C	1	
D6	⚠	F31455G10XN	DOOR SCREEN A	1	
D8		F30127K10KXP	DOOR HANDLE	1	
D9		F30216S10XP	HANDLE SPRING	1	

8.4. WIRING MATERIALS

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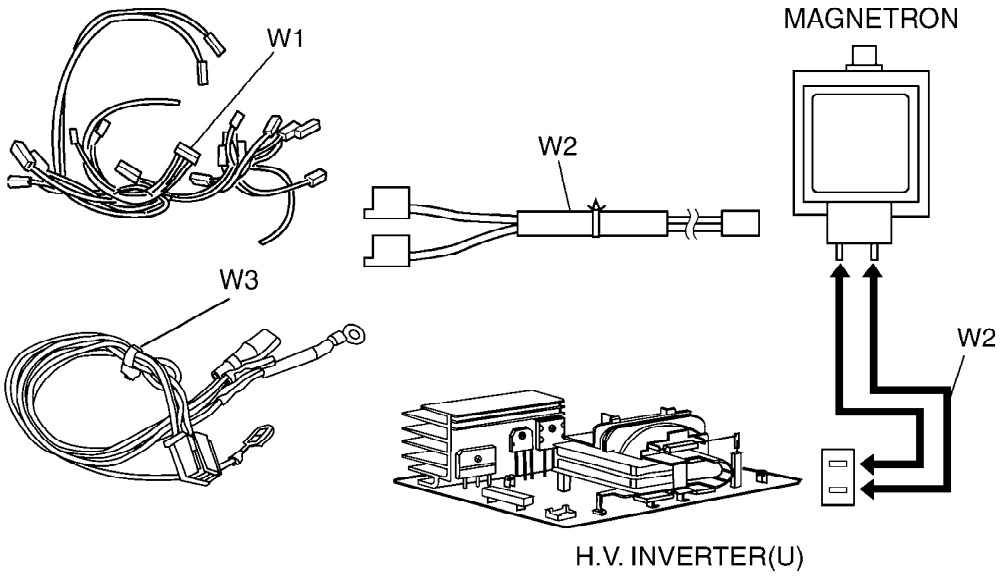
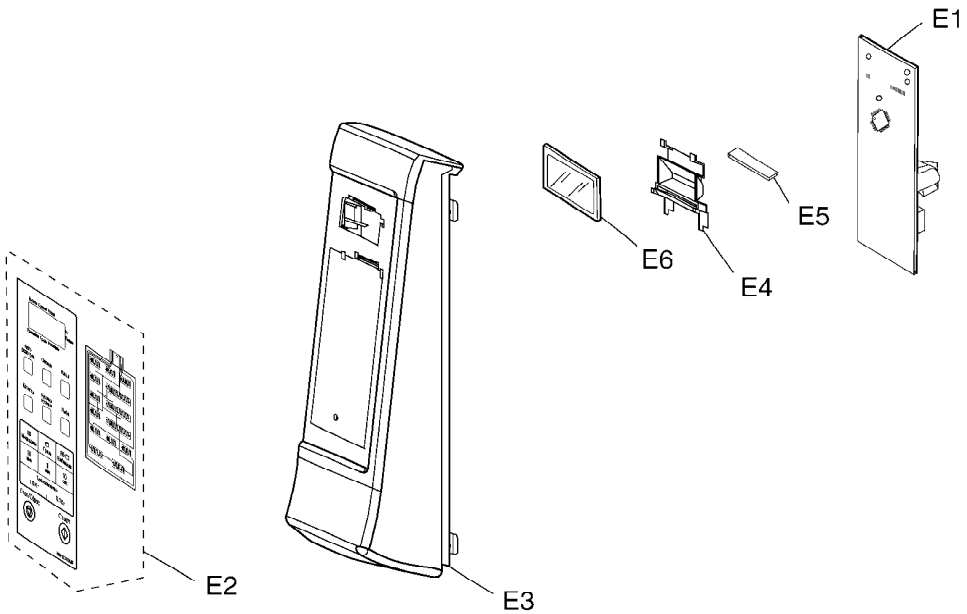


Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
W1		F030A7K10ZP	LEAD WIRE HARNESS	1	
W2		F030E7K10ZP	H.V. LEAD WIRE	1	
W3		F03595G50XN	LEAD WIRE	1	(INCLUDING THERMISTOR)
W4		F030F7K10XP	HARNESS B	1	

8.5. ESCUTCHEON BASE ASSEMBLY



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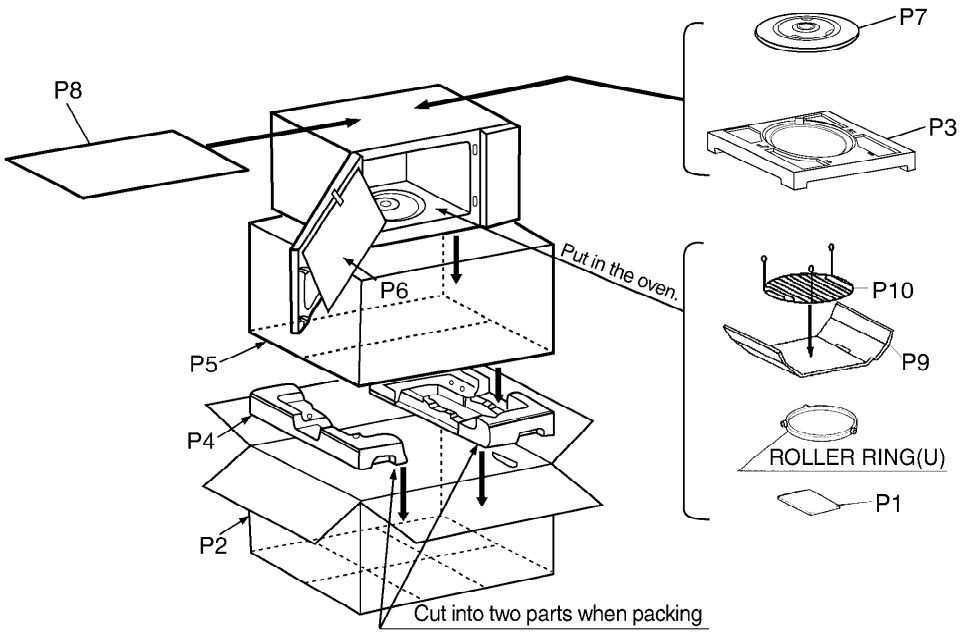
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
E1		F603L7K10ZP	D.P.CIRCUIT (AU)	1	
E2		F630Y7K10SZP	MEMBRANE SWITCH (U)	1	
E3		F80347K10SXP	ESCUTCHEON BASE	1	
E4		F66175L00AP	DISPLAY TUBE COVER	1	
E5		F67005U40XN	RUBBER CONNECTOR	1	
E6		AEDDHJ7K10XP	DISPLAY	1	

8.6. PACKING AND ACCESSORIES



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
P1		F00037K10ZP	INSTRUCTION MANUAL	1	
P2		F01027K10SZP	PACKING CASE, PAPER	1	
P3		F01047K10XP	UPPER FILLER	1	
P4		F01057K10XP	LOWER FILLER	1	
P5		F01068100XN	P.E BAG	1	
P6		F01075G10XN	DOOR SHEET	1	
P7		A06015G10XN	COOKING TRAY	1	
P8		F01924T00AP	SHEET	1	
P9		F01085G50XN	TRAY PACKING	1	
P10		F060V5G50XN	OVEN RACK	1	

8.7. H.V. INVERTER MAIN PARTS LIST

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Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
Q701		A691EM300GP	IGBT	1	
Q702			IGBT	1	
C701		ECWF5184N300	FILM CAPACITOR	1	
C702		ECQE2505T869	FILM CAPACITOR	1	
C703		ECWF2395N632	FILM CAPACITOR	1	
DB701		B0FBBS000001	RECTIFIER BRIDGE	1	
L701		F5020M300GP	CHOKE COIL	1	
R702		D0CM352JA002	SAND BAR RESISTOR	1	
T701		A609AM300GP	TRANSFORMER	1	(INCLUDING D701, D702, C706, C707)
D701, D702	⚠	B0FBAZ000001	DIODE	2	
C706		ECWH30562U03	FILM CAPACITOR	1	
C707		ECWH30432U04	FILM CAPACITOR	1	

9. DIGITAL PROGRAMMER CIRCUIT

9.1. SCHEMATIC DIAGRAM

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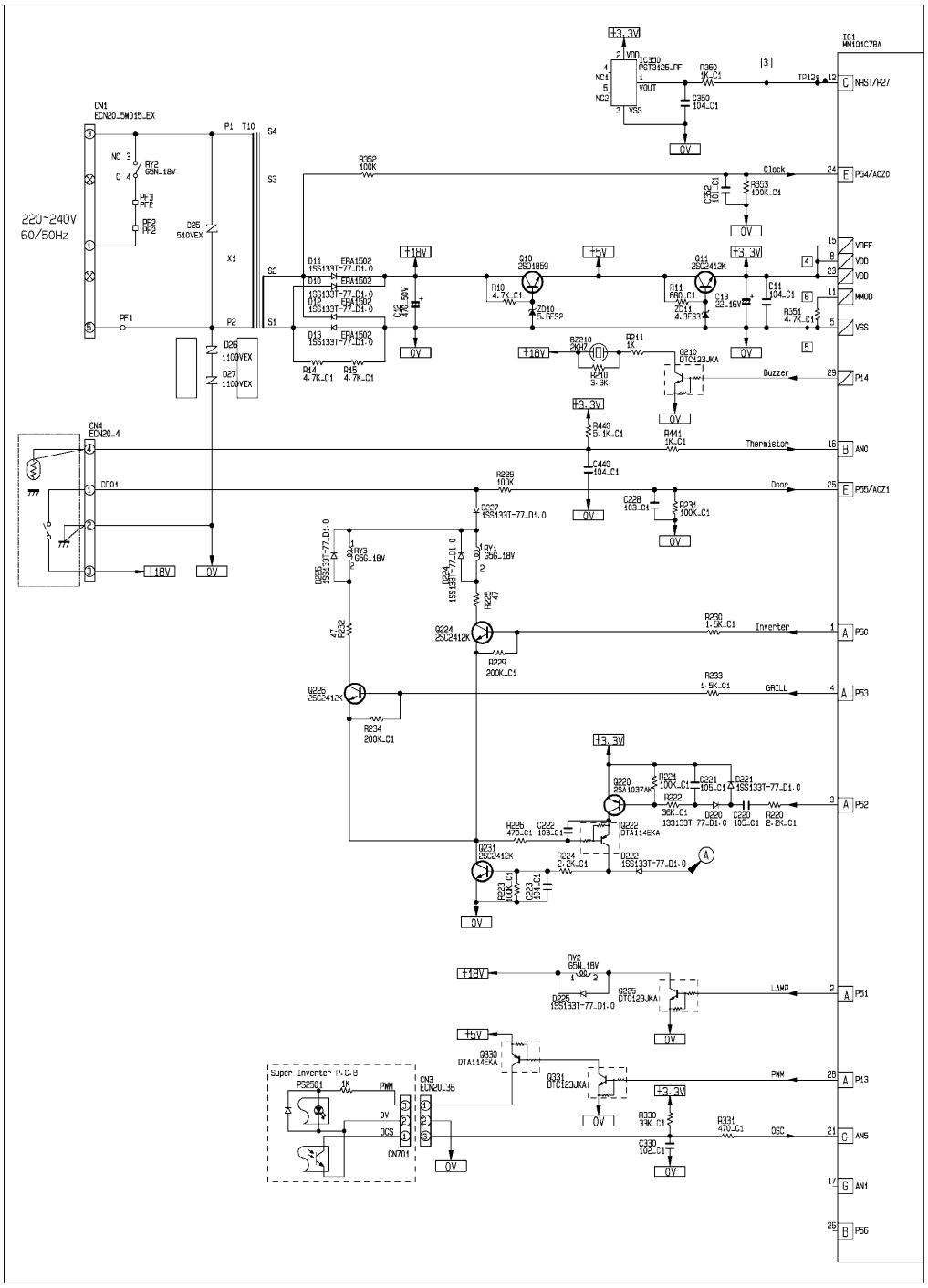

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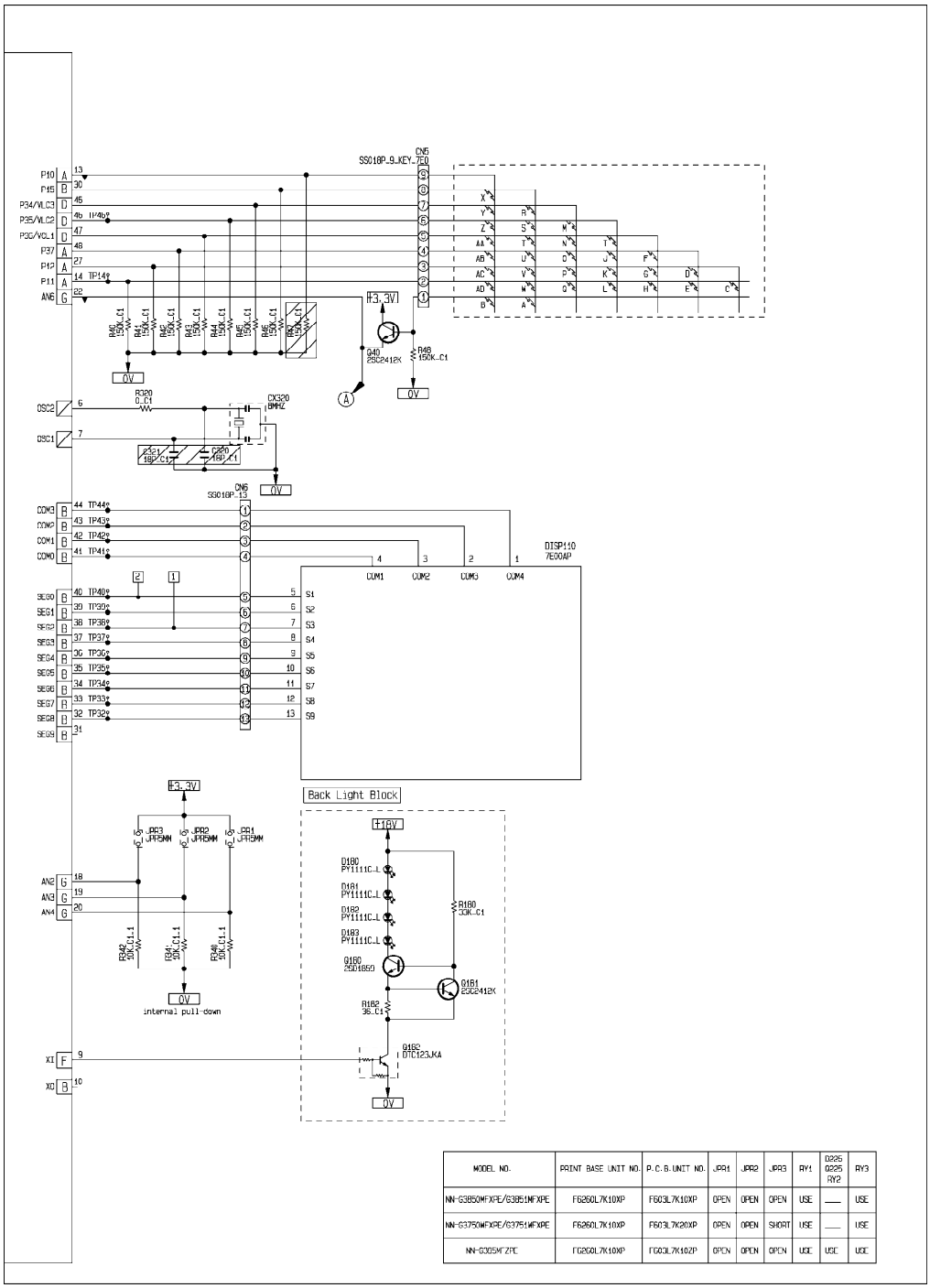

MODEL NO.	PRINT BASE UNIT NO.	P.C.B.UNIT NO.	JPR1	JPR2	JPR3	RY1	D225 D225 RY2	RY3
NN-G3850WFXPE/G3851WFXPE	F6260L7K10XP	F603L7K10XP	OPEN	OPEN	OPEN	USE	——	USE
NN-G3750WFXPE/G3751WFXPE	F6260L7K10XP	F603L7K20XP	OPEN	OPEN	SHORT	USE	——	USE
NN-G305WZPE	FG20G0L7K10XP	FG03L7K102P	OPEN	OPEN	OPEN	USE	USE	USE

9.2. PARTS LIST

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Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
BZ210		L0DDEA000014	BUZZER	1	2.0KHz
C12		AECETK1H471B	AL CHEM CAPACITOR	1	470 μ F/50V
C13		AECETS1C220B	AL CHEM CAPACITOR	1	22 μ F/16V
C352		F1H1H101A894	CHIP CAPACITOR	1	100PF/50V
C330		F1H1H102A896	CHIP CAPACITOR	1	1000PF/50V
C222, C228		F1H1H103A897	CHIP CAPACITOR	2	0.01 μ F/25V
C11, C223, C350, C440		F1H1E104A108	CHIP CAPACITOR	4	0.1 μ F/25V
C220, C221		F1H1A105A068	CHIP CAPACITOR	2	1 μ F/10V
CN1		K1KA03AA0108	CONNECTOR	1	5 pin
CN3		F03524Y50AP	LEAD WIRE	1	
CN4		K1KA04AA0086	CONNECTOR	1	
CX320		EFOEC8004A4	CERAMIC RESONATOR	1	8.00MHz
D220-D222, D224, D226, D228		B0AACK000004	DIODE	6	
D10-D13		B0EAKT000025	DIODE	4	
D25		AERZ511KSBN	VARISTOR	1	
D26, D27		AERZ102KSBN	VARISTOR	2	
IC1		MN101C78ADK	L.S.I.	1	
IC350		C0EBE0000401	IC	1	
Q10		B1BAAJ000003	TRANSISTOR	1	
Q210, Q331		B1GBCFEL0002	CHIP DIGI-TRANSISTOR	2	
Q11, Q40, Q224, Q226, Q231		2SD0601A0L	CHIP TRANSISTOR	5	
Q220		2SB0709A0L	CHIP TRANSISTOR	1	
Q222, Q230		UNR211100L	CHIP TRANSISTOR	2	
R320		D0GBR00JA071	CHIP RESISTOR	1	0 Ω, 1/10W, 5%
R226, R331		D0GB471JA069	CHIP RESISTOR	2	470 Ω, 1/10W, 5%
R11		D0GB681JA069	CHIP RESISTOR	1	680 Ω, 1/10W, 5%
R350, R441		D0GB102JA071	CHIP RESISTOR	2	1K Ω, 1/10W, 5%
R230, R233		D0GB152JA072	CHIP RESISTOR	2	1.5K Ω, 1/10W, 5%
R220, R224		D0GB222JA072	CHIP RESISTOR	2	2.2K Ω, 1/10W, 5%
R10, R14, R15, R351		D0GB472JA072	CHIP RESISTOR	4	4.7K Ω, 1/10W, 5%
R440		D0GB512JA072	CHIP RESISTOR	1	5.1K Ω, 1/10W, 5%
R350		D0GB103JA072	CHIP RESISTOR	1	10K Ω, 1/10W, 5%
R330		D0GB333JA070	CHIP RESISTOR	1	33K Ω, 1/10W, 5%
R222		D0GB363JA072	CHIP RESISTOR	1	36K Ω, 1/10W, 5%
R221, R223, R231, R353		D0GB104JA068	CHIP RESISTOR	4	100K Ω, 1/10W, 5%
R40-R46, R48		AERJ06J154R	CHIP RESISTOR	8	150K Ω, 1/10W, 5%
R229, R234		D0GB204JA068	CHIP RESISTOR	2	200K Ω, 1/10W, 5%
R211		D0AE102JA155	CARBON FILM RESISTOR	1	1K Ω, 1/4W, 5%
R225, R232		D0AE470JA155	CARBON FILM RESISTOR	2	47 Ω, 1/4W, 5%
R210		D0AE332JA155	CARBON FILM RESISTOR	1	3.3K Ω, 1/4W, 5%
R228, R352		D0AE104JA155	CARBON FILM RESISTOR	2	100K Ω, 1/4W, 5%
RY1, RY3		AEBGJQC25F18	POWER RELAY	2	
RY2		K6B1AZA00011	POWER RELAY	1	
ZD10		B0BA5R600016	ZENER DIODE	1	
ZD11		B0BA4R400002	ZENER DIODE	1	
T10		G4C3AAH00007	LOW VOLTAGE TRANSFORMER	1	

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